Integrated Defense Acquisition, Technology, and **Logistics Life Cycle Management System**

1. INTRODUCTION. The Integrated Defense Acquisition, Tech-specific needs of individual programs. This is called the "Integrated Defense nology, and Logistics Life Cycle Management System Chart is a training aid for Acquisition, Technology, and Logistics Life Cycle Management System" and is Defense Acquisition University (DAU) courses. It serves as a pictorial roadmap illustrated on the front of this chart. of key activities in the systems acquisition processes. The chart illustrates the interaction of the three-key processes that must work in concert to deliver the capabilities required by the warfighters: the requirements process (Joint Capabilities Integration & Development System [JCIDS]); the acquisition process (Defense Acquisition System); and program and budget development (Planning, Programming, Budgeting, and Execution [PPBE] process). These three major decision support systems are illustrated in the top left front of this chart. This chart is based on policies and guidance from the following Department of

Defense (DoD) documents and Web sites: • **DoD Directive 5000.01.** The Defense Acquisition System, May 12, 2003 • **DoD Instruction 5000.02.** *Operation of the Defense Acquisition System,* Dec. 8, 2008 Defense Acquisition Guidebook (DAG). https://akss.dav.mil/dag.

• CJCS Instruction 3170.01F. Joint Capabilities Integration and Development System

• CJCS Manual 3170.01C. Operation of the Joint Capabilities Integration and Development System, May 1, 2007

• CJCS Instruction 6212.01E. Interoperability of Information Technology and National Security Systems, Dec. 15, 2008 • The following Internet sites provide additional information:

 Acquisition, Technology & Logistics Knowledge Sharing System (AKSS). https://akss.dau.mil. The AKSS provides links to mandatory and discretionary information and best practices for defense acquisition

tion-related communities of practice, other special interest areas, and to the DAU Continuous Learning Center

• Acquisition Community Connection (ACC). https://acc.dau.mil. ACC provides information

on acquisition, technology, and logistics processes. ACC has links to acquisi-

• DAU Continuous Learning Center (CLC). http://clc.dau.mil. The CLC provides access to lessons for professional development and current information on new initia-

• Defense Acquisition Policy Center. https://akss.dau.mil/dapc/index.html. The Acquisition Policy Center provides a tutorial, a multimedia JCIDS presentation, and copies of the latest military department, DoD 5000, and CJCS 3170 policy docu-

2. ACQUISITION PROCESS. The acquisition process is structured by DoDI 5000.02 into discrete phases separated by major decision points (called milestones or decision reviews) with a number of key activities to provide the basis for comprehensive management and informed decision aking. The number of phases and decision points are tailored to meet the

Acronym I			
BES	Budget Estimate Submission	10C	Initial Operational Capability
DAES	Defense Acquisition Executive Summary	IOT&E	Initial Operational Test and Evalu- tion
DCMA	Defense Contract Management Agency	OASD(NII)	Office of the Assistant Secretary of Defense for Networks and
DISA	Defense Information Systems		Information Integration
	Agency	PPBE	Planning, Programming, Budget-
DOT&E	Director, Operational Test & Evalu-		ing, and Execution
	ation	P-CDRA	Post-Critical Design Review Assess
DOTMLPF	Doctrine, Organization, Training,		ment
	Materiel, Leadership and Educa-	POM	Program Objectives Memorandun
	tion, Personnel, and Facilities	R&D	Research and Development
EVMS	Earned Value Management System	T&E	Test and Evaluation
FOT&E	Follow-On Operational Test and		
	Evaluation .		
JCIDS	Joint Capabilities Integration &		
	Development System		

Figure 1. Requirements for Milestone/Decision Reviews

Acquisition Program Baselines Acquisition Strategy⁵ (see Figure 2) Acquisition Information Assurance Strategy (all IT incl NSS) Alternate LIve Fire T&E Plan (pgms w/waiver from full-up LFT&E)2 Analysis of Alternatives (AoA)38 Benefit Analysis & Determination 188 (bundled acquisition Beyond LRIP Report² (include MDAPs that are also MAIS Capability Development Document (CDD)5 ability Production Document (CPD) nger-Cohen Act (CCA) Compliance⁵ tition Analysis^{1&8} (depot-level maintenance rule) X X X X ent CIO Confirmation of CCA Compliance ent Cost Estimate 589 (MAIS: ontional MDAP ration of Technology Issues (MDAP & MAIS) e Logistics/Source of Repair Analysis^{1&8} ion Prevention Control Plan¹ Cost Analysis Requirements Description^{5&9} (MDAP & MAIS Data Management Strategy¹ (MDAP, MAIS & ACAT II) DoD CIO Confirmation of CCA Compliance (MDAP & MAIS) Economic Analysis (MAIS)7 (may be combined w/AoA at MS-A) Industrial Base Capabilities¹ (MDAPs only) X X X dent Cost Estimate (ICE)5&10 (MDAPs only) Independent Technology Readiness Assessment 11 X X X Information Support Plan^{1&5} Initial Capabilities Document (ICD) 485 Initial Operational Test & Evaluation Completed (ACAT I & II) Item Unique Identification (ILIID) Plan (part of SEP) roperability Test Certification (IT & NSS) Life Cycle Signature Support Plan⁵ Life Cycle Sustainment Plan¹ Live Fire T&E Waiver² (covered systems) (n/a MAIS Live Fire T&E Report² (covered systems) (n/a MAIS) LRIP Quantities MDAP & ACAT II (n/a AIS) ver Estimate (MDAPS only)5 Milestone Decision Authority (MDA) Certification (MDAPs only) MDA assessment of chem, bio, rad, and nuc survivability Military Equipment Validation 1 Net-Centric Data Strategy^{5&} Operational Test Agency Report of OT&E Results Preliminary Design Review (PDR) Report, (If PDR after MS B) 15

X X X

X X X

MAIS whenever an economic analysis is required

O. May be CAIG Assessment at Milestone A

ummarized in TDS; details in ISP

. SAR at program initiation; annually thereafter

. Validated by Component; AIS use DIA validated

. If PDR conducted after MS B, the MDA conducts a

1. ACAT ID only if required by DDR&E

1423 is a requirement identified in the solici-

tation and imposed in a contract that lists

Test & Evaluation Risk Management Resource Management — Funding Under an Evolutionary Acc Strategy — Advance Procurement

-Competition Advocates

Defense Products

Program Structure

Capability Needs

Acquisition Approach

◆ Small Business Innovative Research (SBIR) Technologies System Engineering Plan Interoperability Information Interoperability — Other-Than Information Interoperate

Figure 2. Acquisition Strategy Considerations

— International Cooperation ◆ International Cooperative Strategy ◆ International Interoperability ◆ International Cooperation Compliance Testing Required for Foreign Military Information Technology Research & Technology Protection — Protection of Critical Information — Contract Approach

◆ Performance-Based Business Strategy — Anti-Tamper Measures Information Assurance ◆ Modular Contracting Product Support Strategy

◆ Contract Bundling ◆ Major Contract(s) Planned Human Systems Integration Environmental Safety, and Occupational ◆ Multi-Year Contracting ◆ Contract Type Modular Open Systems Approach Contract Incentives Business Considerations

◆ Integrated Contract Performance Management ◆ Fostering a Competitive Environment ◆ Special Contract Terms and Conditions Warranties Ensuring Future Competition for ◆ Component Breakout

Potential Sources

-Market Research

Dual-Use Technologies

— Industrial Capability

Use of Commercial Plants

- Commercial and Non-Developm

 Building Competition Into Individual uipment Valuation Acq Strategies Applying Competition to Acquisition ◆ Program Description ◆ Accounting Review Applying Competition to ◆ Contract Implications Best Practices Fvolution ary Aca Competition and Source of Support
 Relief, Exemption, or Waiver Additional Acq Strategy Topics

 Industry Involvement Potential Obstacles to Competition —Exclusive Teaming Arrangement —Sub-Tier Competition

The acquisition process begins with the identification of a capability need that requires a material solution. The process encompasses the activities of design, fabrication, test, manufacture, operations, and support. It may involve modifications, and it ends with disposal/recycling/demilitarization. Major upgrade or modification programs may also follow the acquisition life cycle

The policies and principles that govern the operation of the defense acquisition system are divided into five major categories as stated in DoDD 5000.01: 1.) Flexibility—tailoring program strategies and oversight; 2.) Responsiveness rapid integration of advanced technologies through evolutionary acquisition; 3.) Innovation—adoption of practices that reduce cost and cycle time; 4.) Discipline—use of program baseline parameters as control objectives; and 5.) Effective management—decentralization to the extent practicable. DoD components first try to satisfy capability needs through non-materiel

solutions such as changes in doctrine or tactics. If existing U.S. military systems or other on-hand materiel cannot be economically used or modified to meet the warfighter's need, a materiel solution may be pursued according to the following hierarchy of alternatives:

• Procurement (including modification) of commercially available domestic or international technologies, systems or equipment, or allied systems or equip-• Additional production or modification of previously developed U.S. and/or

allied military systems or equipment • Cooperative development program with one or more allied nations • New joint, DoD component, or government agency development program New DoD component-unique development program. A list of program information requirements to ensure informed decision mak-

ing is found in DoDI 5000.02, enclosure 4. The Milestone Decision Authority may tailor this information based on program needs, but normally may not omit documents required by statute or mandatory policy without a waiver (e.g., acquisition program baseline or initial capabilities document). Figure 1 is a simplified chart of information required at milestones and other decision

Other periodic reports: Defense Acquisition Executive Summary (DAES) Report. ACAT I and IAM programs. Quarterly. Also upon Program Objectives Memorandum (POM) and Budget Estimate Submission (BES). For ACAT I only—upon UCR breach. **Selected Acquisition Report (SAR). ACAT I only.** Submitted at program initiation for ships, Milestone B, and annually thereafter. End of quarter following Milestone C, Full-Rate Production Decision Review (FRPDR), and for a baseline

Unit Cost Report (UCR). ACAT I only. Quarterly as part of the DAES Report. Electronic Warfare (EW) Test and Evaluation Report. Annually for all EW programs on the OSD T&E oversight list

Earned Value Management System (EVMS) Reports. See DoDI 5000.02, Table 5, ANS/EIA 748 and the Defense Acquisition Guidebook (DAG). Contractor Cost Data Reports (CCDR). See DoDI 5000.02, Table 4. Software Resources Data Report (SRDR). See DoDI 5000.02, Table 4.

3. MANAGEMENT OF THE ACQUISITION

PROCESS. The person responsible for ensuring the acquisition management system activities result in fulfilling the warfighter's need is the program manager (PM). The PM is also the single point of accountability for accomplishing program objectives for total life cycle systems management, including sustainment. The PM is responsible for the entire system life cycle (design to disposal) (Total Life Cycle System Management [TLCSM] is required by DoDD 5000.01), and must consider supportability, life cycle costs, performance, and schedule in making program decisions. Each defense acquisition program is assigned a PM in accordance with DoD and component policy. The primary program management activities follow:

Planning. One of the first planning activities is the development of an acquisition strategy (see the Defense Acquisition Guidebook), an overarching plan that serves as a roadmap for program execution from program initiation through post-production support. It describes how the program will accomplish its objectives in terms of (among others) cost, schedule, performance, risk, and contracting activities

• ACAT I and IA programs normally provide information on the strategy elements as noted in Figure 2. The PM may choose to develop the acquisition strategy as a standalone document or as part of a multipurpose document (e.g., an Army Modified Integrated Program Summary, a Navy Master Acquisition Program Plan, or an Air Force Single Acquisition Management Plan). Each program's acquisition strategy is tailored to meet the specific needs and circumstances of the program. • There are two basic strategy approaches—evolutionary and single step

to full capability. Evolutionary acquisition is the preferred DoD strategy for rapid acquisition of mature technology for the user. An evolutionary approach delivers capability in increments, anticipating the need for future Organizing and Staffing. The establishment, organization, and staffing of the pro-

gram office should be a direct outgrowth of a task analysis that supports the program's acquisition strategy. As the program evolves, the program office nization and staffing should evolve to support the changing task requirements and acquisition environment.

Controlling. The control system consists of standards against which progress can be measured, a feedback mechanism that provides information to a decision maker, and a means to make corrections either to the actions underway Figure 3. **JCIDS Document Flow** Integration ACAT II & below, no significant joint impact; but require Joint Staff Validation & Information ACAT II & below, no significant joint impact; and no Joint Staff review/ Independent All other programs Sponsor. The DoD component responsible for all common docu- KM/DS. Knowledge Management/Decision Support too JPD. Joint Poetntial Designate mentation, periodic reporting, and funding actions required (virtual SIPRNET library for review, approval, and referto support the requirements and acquisition process.

or to the standards. Examples of standards include the acquisition program baseline, exit criteria, program schedules, program budgets, specifications, plans, and test criteria. Examples of feedback mechanisms for program control, oversight, and risk management include the Joint Requirements Oversight Council, overarching integrated product team, Defense Acquisition Board, Information Technology Acquisition Board, Defense Space Acquisition • Global Information Grid (GIG). The globally interconnected, end-to-end set of Board, integrated baseline review, technical reviews, and developmental and operational test and evaluation

Leading. Effective leadership is the key to program success. It involves developing an organization's mission, vision, and goals, and clearly articulating a set of core values. Dominant leadership roles in program management include strategy setting, consensus/team building, systems integration, and change management. For successful teams, factors such as empowerment, clear purpose, open communication, adequate resources, and a team-oriented behavioral environment are critical.

4. JOINT CAPABILITIES INTEGRATION AND

DEVELOPMENT SYSTEM (JCIDS). The procedures established in the JCIDS support the chairman of the Joint Chiefs of Staff and the Joint Requirements Oversight Council in identifying, assessing, and prioritizing joint military capability needs. These needs are reflected in a series of documents that support the acquisition process (see figure 3):

• Initial Capabilities Document (ICD). A document that describes the need for a mate riel approach to a specific capability gap derived from an initial analysis of materiel approaches. The ICD defines the capability gap in terms of the functional area, the relevant range of military operations, desired effects, and time. It summarizes the results of the Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, and Facilities (DOTMLPF) analysis and describes why non-materiel changes alone are not adequate to fully provide the capability. The ICD supports the Materiel Development Decision and Milestone A

• Capability Development Document (CDD). A document that captures the information necessary to develop a proposed program, normally using an evolutionary acquisition strategy. The CDD outlines an affordable increment of militarily useful, logistically supportable and technically mature capability. The CDD supports program initiation at Milestone B. Capability Production Document (CPD). A document that addresses the production

elements specific to a single increment of an acquisition program. The CPD supports Milestone C

capability gaps, capability needs, and approaches to provide those capabilities within a specified functional or operational area. Based on national defense policy and centered on a common joint warfighting construct, the analyses initiate the development of integrated, joint capabilities from a common understanding of existing joint force operations, and DOTMLPF capabilities and deficiencies. See upper left front of chart.

Capabilities-Based Assessment (CBA). CBA is

the analysis part of JCIDS that defines

DOTMLPF Change Recommendation (DCR). A document focusing on changes that are primarily non-materiel in nature, although there may be some associated materiel changes (additional numbers of existing commercial or non-developmental required. DCRs are normally referred to as "non-materiel" solutions, while acquisition programs are referred to as

"materiel" solutions. Military Utility Assessment (MUA). Replaces the ICD for Joint Capability Technology Demonstrations (JCTD) or other approved prototype projects, and guides development of CDD and CPD for these efforts.

Interoperability. The policies for interoperability are found in CJCSI 3170.01 series, JCIDS, and CJCSI 6212.01 series, Interoperability of Information Technology (IT) and National Security Systems (NSS). The following are key aspects of this

information capabilities associated processes and personnel for collecting, processing, storing, disseminating, and managing information on demand to warfighters, policy makers, and support personnel. The GIG includes all owned and leased communications and computing systems and services, software, data, security services, and other associated services necessary to achieve information superiority

• Information Exchange Requirements (IERs) characterize the information exchanges to be performed by the proposed system(s). For CDDs, top-level IERs are those information exchanges that are between systems of combatant command/Service/agency, allied, and coalition partners. For CPDs, top-level IERs are those information exchanges that are external to the system with other commands/ vices/agencies, allied, and coalition systems. IERs identify who exchanges what information with whom, why the information is necessary, and how the exchange must occur.

 Integrated Architectures have multiple views or perspectives (operational view, systems view, and technical standards view) that facilitate integration and promote interoperability across family-of-systems and system-of-systems and compatibility among related architectures. The linkages among the views of an integrated architecture are illustrated by Figure 4. • The operational architecture view is a description of the tasks and activities, opera-

tional elements, and information flows required to accomplish or support a • The systems architecture view is a description, including graphics, of systems and

interconnections providing for or supporting warfighting functions. • The technical standards architecture view is the minimal set of rules governing the arrangement, interaction, and interdependence of system parts or elements whose purpose is to ensure that a conforming system satisfies a specified

J-6 Interoperability and Supportability Certification. The Joint Staff, J-6 will certify interoperability and Supportability Certification. erability and supportability requirements for JCIDS documents (CDD and CPD) and the Information Support Plan (ISP), regardless of ACAT level, for conformance with joint IT and NSS policy and doctrine and interoperability

• J-6 Supportability Certification. The J-6 certifies to OASD(NII) that programs, regardless of ACAT, adequately address IT and NSS infrastructure requirements. This includes availability of bandwidth and spectrum support,

• Live Fire T&E (LFT&E). A test process to evaluate the vulnerability and/or

dation occurs after receipt and analysis of the JITC interoperability system test certification. Net-Ready Key Performance Parameter (NR-KPP) assesses information needs, timeliness, assurance, and net-ready attributes required for both the technical exchange of information and the end-to-end operational effectiveness of that exchange.

NR-KPP consists of verifiable performance measures and associated metrics required to evaluate the timely, accurate, and complete exchange and use of information to satisfy information needs for a given capability. The NR-KPP is composed of five elements: Compliant solution architectures, Compliance with Net-Centric Data and Services Strategy, Compliance with Applicable Technical Standards and Interfaces through the GIG Technical Guidance, Compliance with mandatory DOD Information Assurance Requirements, and DOD Supportability Requirements. Characterization and execution of these 5

6212.01 series.

5. INFORMATION TECHNOLOGY (IT) & NATIONAL SECURITY SYSTEMS (NSS). Software

components of defense systems should be tightly linked to and managed as an inherent part of the overall systems engineering processes. Software-specific • Ensuring that software technologies and complex algorithms are matured prior to Milestone B.

elements must be in compliance with DOD policy and the guidance in CJCSI

ments between systems. As part of the review process, J-6 requests support-

• J-6 Interoperability System Validation validates the DISA/Joint Interoperability

Test Command (JITC) interoperability system test certification, which is

ability assessments from DISA and DoD agencies.

 Careful consideration of COTS capabilities and licensing. For COTS IT solutions, specific plans by phase are required. Additionally, use of the DoD Enterprise Software Initiative and "SmartBUY" is required for commercial software

A program management tool that integrates the work scope, schedule, and cost purchases whenever appropriate

• Exploiting software reuse wherever feasible. • Selecting contractors with systems domain experience, successful past-performance, and mature development capabilities and processes. • Use of DoD standard data IAW DoDD 8320.01 and compliance with the DoD

Net-Centric Data Strategy. • Early planning for transition to software support.

• Designing extensible and modular software so as to better support incremental life cycle product upgrades. • Evaluating programming languages used in the context of their life cycle

costs, support risks, and interoperability • Assessing information operations risks (see DoD Directive S-3600.01) using techniques such as Program Support Reviews.

 Emphasis on software security and assurance considerations throughout the life cycle, including certification of foreign nationals who work on key defense system software. Other detailed mandatory IA considerations required by life cycle phase include development of an IA strategy. Details of the DoD IT Security Certification & Accreditation Process (DITSCAP) can be found in DoD S-3600.01,

DoDD 8500.01, DoDI 8580.01, and DoDI

Other IT & NSS Management Considerations. Defense systems must be inherently joint and networkcentric; as such, IT is an inherent enabler of net-centricity. Additionally, a number of legal and regulatory con-

siderations apply to IT

and NSS systems. These

siderations include

Linkages Between Architectural Views DoD Architecture Framework version 1. All View — Describes the scope and context (vocabulary) of the architecture Specific capabilities required to satisfy information exchanges

funding and personnel, and identifying dependencies and interface require• The GIG (mentioned earlier) (DoDD 8100.01) is the organizing and transforming construct for managing IT throughout the DoD. • The GIG Technical Guidance (GTG) contains a program questionnaire and compliance matrices/declaration tables that point to applicable GIG Enter-

prise Service Profiles (GESPS) for use in the interoperability and supportbased upon a joint-certified NR-KPP, approved in the CDD and CPD. Valiability certification process. Enterprise and domain-specific architectures are key to achieving scalable and interoperable IT systems. Use of the DoD Architecture Framework (DoDAF), which requires programs to document their architectures in a

series of specially formatted "views" (operational, systems, and technical), produced at various points in a program's life cycle is mandatory.

 Collections of standards that the DoD has selected as key to facilitating system interoperability have been collected into an online tool, the DoD IT Standards Registry (DISR).,

 The Clinger-Cohen Act (CCA) applies to all federal IT and NSS acquisitions. 5000-series processes are inherently CCA-compliant. Formal certification of compliance by MS phase is required for all programs including formal notification to Congress IAW Public Law 108-87. Additionally, PMs are responsible for entering key parameters of their projects into the DoD IT Registry, an online reporting system.

• Management of Defense Business Systems. A defense business system is an information system, other than a NSS, operated by, for, or on behalf of the DoD, including financial systems, mixed systems, financial data feeder systems, and IT and information assurance infrastructure. Review and certification of defense business systems modernizations with total modernization or development funding exceeding \$1 million is overseen by the Defense Business Systems Management Committee and is described by enclosure 11 to DoDI 5000.02.

6. EARNED VALUE MANAGEMENT (EVM).

parameters of a program in a manner providing objective performance measurement and management. As work is performed, the corresponding budget value is "earned." EVM directly supports nine management processes: organizing, scheduling, work authorization, accounting, indirect management, management analysis, change incorporation, material management, and subcontract

Processes Associated with EVM

View

ntifies what needs to be

ccomplished and who does it

ocurement of the selected system capabilities

• ANSI/EIA-748 EVMS Standard. Thirty-two management guidelines published in the American National Standards Institute/Electronic Industries Alliance Standard 748, Earned Value Management Systems (ANSI/EIA-748). The DoD

formally adopted the guidelines in ANSI/EIA-748 in August 1999 for applica-

tion to defense acquisition programs • Integrated Baseline Reviews (IBR). Joint government/contractor reviews to assess the realism and accuracy of the integrated performance measurement baseline (work, schedule, and budget) and gain a mutual understanding of inherent risks. • **EVMS Compliance.** The continuing operation of the contract

tor's EVMS in accordance with the guidelines in ANSI/ • **EVMS Validation.** A formal determination by an independent party, normally DCMA, that a contractor's EVMS meets the guidelines in ANSI/EIA-748. • EVMS Surveillance. A recurring process

by an independent party, normally DCMA, assessing the continuing compliance of the contractor's EVMS with ANSI/EIA-748 and the contractor's written svstem documentation **EVM Independent Variables** Actual Cost of Work Performed (ACWP or Actual Cost).

The costs actually incurre

and recorded in accom-

plishing work performed.

• Budget at Completion (BAC or Authorized Work). The total authorized budget for accomplishing the program scope of work. BAC is a term that

may also be applied to lower level budgets. Budgeted Cost for Work Performed (BCWP or Earned **Value).** The value of completed work expressed in terms of the budget assigned to that work. Budgeted Cost for Work Scheduled (BCWS or Planned **Value).** The time-phased budget plan for work

Joint Interoperability Test Com-

currently scheduled. • EVM Reporting—A common work-breakdown

Risk to gov't

Fee/profit

As incurred

structure (WBS) that follows the DoD WBS Handbook (MIL-HDBK-881) is required for all EVM-related reporting. • Contract Performance Report (CPR). A report, prepared by the contractor, containing contract cost and schedule performance information to identify problems

• Integrated Master Schedule (IMS). A time-based schedule containing the networked, detailed tasks necessary to ensure successful program execution. (DI-

early and forecast future performance. (DI-MGMT-81466A)

• Contract Funds Status Report (CFSR). A report containing contract funding data. (DI-MGMT-81468)

7. CONTRACTING.

Acquisition Plan. A formal written document reflecting the specific actions necessary to execute the approach established in the approved acquisition strategy and guiding contractual implementation. (FAR Subpart 7.1 and DFARS Subpart

Source Selection Plan (SSP). Explains the source selection process for a particular acquisition. Typically, the SSP consists of two parts. The first part describes the organization and responsibilities of the source selection team. The second part identifies the evaluation criteria and detailed procedures for proposal

A Draft Request for Proposal (RFP) and Presolicitation Conferences. Used to ensure that the requirements are understood by industry. Open and honest feedback is Request for Proposal (RFP). Used in negotiated acquisitions to communicate the

government's requirements and to solicit proposals. Request for Information (RFI). May be used when the government does not presently intend to award a contract, but wants to obtain price, delivery, and other market information or capabilities for planning purposes. Responses to these notices are not offers and cannot be accepted by the government to form a binding contract. There is no required format for RFIs.

Contract Management is the process of systematically planning, organizing, executing, and controlling the mutually binding legal relationship obligating the seller to furnish supplies and/or services and the buyer to pay for them. **Contract.** The formal written agreement between the government and industry. See Figure 5 for the characteristics of the most common contract types. Figure 6 illustrates the most likely contract type for each phase of the acquisition

Performance-Based Contracting describes the work requirements in terms of outcomes (what the contractor must accomplish) rather than inputs or processes the contractor must provide. Performance-based requirements get the government out of the "how to" business and into the "what we need" or system

Statement of Work; Statement of Objectives; Performance Work Statement; System Specification; **Contract Data Requirement List.** Documents contained in the solicitation to industry (RFP) that define contractual requirements: • **Statement of Work (SOW)** details the work the contractor will perform and, when necessary, specifies how the work is to be performed.

uct/service. The SOO contains top-level objectives of the program and is usually one to two pages. The contractor is tasked in the RFP to provide a Performance Work Statement (PWS) or a SOW in response to the SOO. • Performance Work Statement (PWS) specifies what outcomes the government wants but does not dictate HOW the work will be performed. This allows the contractor to use innovation in the design, development, and manufacturing of the product. DoD prefers the use of a PWS over an SOW.

• Statement of Objective (\$00). Performance-based broad objectives of the prod-

• System Specification sets forth the technical Characteristics of Contract Types performance requirements the system must achieve (what the system will do). Shall delive Contract Data Requirement List (CDRL), DD Form Risk to contractor Low

Post-Critical Design Review (CDR) Report

Selected Acquisition Report (SAR)^{4&13}

Systems Engineering Plan (SEP)

Test & Evaluation Strategy (TES)

Technology Readiness Assessment (TR

Test & Evaluation Master Plan (TEMP)

Part of TDS or Acquisition Strategy

Validated by DIA for ACAT ID: AIS use DIA validated

capstone info/ops Threat Assessment Decisi Milestone C if equivalent to FRP

MDAP: A,B,C; MAIS: A, B, FRP

Milestone C if Program Initiation

Milestone C if no Milestone E

Spectrum Supportability Determination⁸

System Threat Assessment (STA) (ACAT II)58

System Threat Assessment Report (STAR) (ACAT I)

Pgm Environ, Safety & Occup Health Evaluation (PESHE)5

Replaced System Sustainment Plan⁵ (MDAPs only)

Program Protection Plan (PPP)

contract data requirements that are authorized or a specific acquisition. **Cost Type Contract.** A family of cost-reimburse-CPFF max 15/10% No limit ment type contracts in which the government pays the cost (subject to specified limitations)

and the contractor provides "best efforts." This type may provide for payment of a fee that may consist of an award fee, incentive fee, or fixed fee, or combinations of the three fee types. The government assumes most of the cost risk in this type of contract Engineering Change Proposal (ECP). A formal document used to make engineering

changes to configuration management baselines. ECPs are implemented by contract modification(s). Fixed Price Type Contract: Firm Fixed Price (FFP) or Fixed Price Incentive-Firm (FPI[F]). A family of fixed-price type contracts in which the government pays a price that is subject to specified provisions and the contractor delivers a product or service.

This type may provide for payment of incentives or other sharing arrange-

ments. The contractor bears most of the cost risk in this type of contract.

8. COST ESTIMATING AND FUNDING.

Government Budget Plan. The generic title for an internal government document that plans the long-range budgeting strategy for the life of a given program. Planning, Programming, Budgeting, and Execution (PPBE) Process. The PPBE Process is a time-driven resource allocation process to request funding for all operations, including weapon system development and acquisition. It is essential to convert each program's event-driven acquisition strategy and phasing into the PPBE Process calendar-driven funding profiles to assure the appropriate

amount and type of funds are available to execute the desired program. **Planning.** In the first year of a new U.S. president's administration, a National Security Strategy (NSS) is issued. A Quadrennial Defense Report (QDR) is due concurrently with the president's budget to Congress in the second year of a new administration. The Guidance for Development of the Force (GDF) and Joint Programming Guidance (JPG)—established in even-numbered calendar years—set forth broad policy objectives and military strategy, and provide programming guidance for the POM. In odd-numbered calendar years, the

GDF and JPG are issued at the discretion of the Secretary of Defense. Programming. The POM, developed by DoD components, and the Program Decision Memoranda (PDM), issued by OSD, are the keystone documents completed in this phase. The POM provides strategies for components to meet DoD objectives outlined in the JPG. The POM is reviewed by staff officers of the Secretary of Defense, the commanders of the Unified Commands, and the Joint Chiefs of Staff. The reviews highlight major program issues and alternatives. The Deputy Secretary of Defense reviews the POM issues and decides

on the appropriate course of action. The decisions are documented in the

Figure 6. Contract Type by Phase of the Acquisition Process Deployment & Support FPI(F) ● FFP FPI(F) — Fixed Price Incentive Firm

PDM(s). In odd-numbered years, the director, PA&E, will provide guidance for program adjustments in lieu of a complete POM.

Budgeting. The Budget Estimate Submission (BES) reflects the first one or two vears of the POM. The BES is reviewed by the Under Secretary of Defense Comptroller and the Office of Management and Budget (OMB) for execution feasibility. Funding changes that are due to execution issues are identified in Program Budget Decisions (PBDs). The updated BES is forwarded to OMB and incorporated into the president's budget. The president's budget is due to Congress no later than the first Monday in February. In odd-numbered years, the USD (Comptroller) will provide guidance to the previous on-year budget baseline, potentially in lieu of a complete BES.

Execution Review. Concurrent with the preparation of the POM/BES, "execution" reviews take place in which DoD evaluates actual output against planned performance and adjusts resources as appropriate **Enactment.** The process that the Congress uses to develop and pass the Authorization and Appropriations Bills. In the enactment process, DoD has an opportu- life Cycle Cost (LCC) is the total cost to the government of acquisition and owner-

nity to work with Congress and defend the president's budget. Future Years Defense Program. A massive DoD database and internal accounting system that summarizes forces and resources associated with programs

Funding Appropriation Types: RDT&E Budget Activities:

approved by the Secretary of Defense.

1. Basic Research includes all efforts and experimentation directed toward physical, engineering, environmental, and life sciences related to long-term national security needs.

2. Applied Research translates promising basic research into solutions for broadly defined military needs, short of development projects. This type of effort may vary from systematic mission-directed research, which is beyond that in Budget Activity 1, to sophisticated breadboard hardware, study, programming, and planning efforts that establish the initial feasibility and practicality of proposed solutions to technological challenges. These funds are normally applied during concept refinement. **3. Advanced Technology Development** includes all efforts that have moved into the

development and integration of hardware for field experiments and tests. The results of this type of effort are proof of technological feasibility and assessment of operability and producibility rather than the development of hardware for service use. These funds are normally applied during technol-4. Advanced Component Development & Prototypes includes all efforts necessary to evaluate integrated technologies in as realistic an operating environment as

technology. These funds are normally applied during technology development but could be applied throughout the life cycle. 5. System Development & Demonstration includes those projects in system Engineering & Manufacturing Development but not yet approved for low-rate initial production at Milestone C. These funds are normally applied during the system development & demonstration phase of the life cycle.

possible to assess the performance or cost reduction potential of advanced

These funds are used to support development efforts throughout the life 7. Operational Systems Development includes modifications and upgrades to operational systems.

6. RDT&E Management Support includes test and other types of R&D support.

Procurement is used to finance investment items and should cover all costs

integral and necessary to deliver a useful end item intended for operational

use or inventory Military Construction (MILCON) funds the cost of major construction projects such as facilities. Project costs include architecture and engineering services, construction design, real property acquisition costs, and land acquisition costs necessary to complete the construction project. Military Personnel (MILPERS) funds the costs of salaries and compensation for

active military and National Guard personnel as well as personnel-related

expenses such as costs associated with permanent change of duty station

(PCS), training in conjunction with PCS moves, subsistence, temporary lodging, bonuses, and retired pay accrual. • Operations and Maintenance (O&M) finances those things that derive benefits for a limited period of time, i.e., expenses, rather than investments. Examples are headquarters operations, civilian salaries, travel, fuel, minor construction

projects of \$500K or less, expenses of operational military forces, training and education, recruiting, depot maintenance, purchases from Defense Working Capital Funds, and base operations support **Cost Estimating** is a realistic appraisal of the level of cost most likely to be realized.

tion from actual costs. • **Analogy** is used early in the acquisition life cycle. A one-to-one comparison of an existing system similar to the system you are designing • Parametric uses statistical analysis from a number of similar systems and their

Types of cost estimating are analogy, parametric, engineering, and extrapola-

• Engineering. A bottoms-up estimate using the detailed WBS structure to price out components discrete components, such as material, design hours, labor,

• Extrapolation from actual costs. Method used late in the acquisition life cycle after actual cost data are available from the same system at an earlier time. ship of the system over its full life time. It includes the cost of development, acquisition, support, and (where applicable) disposal.

9. TECHNICAL ACTIVITIES.

systems Engineering. Systems Engineering transforms needed operational capabilities into an integrated system design through concurrent consideration of all life cycle needs. Systems Engineering is a structured, disciplined, and documented increasing fundamental knowledge and understanding in those fields of the technical effort that simultaneously designs and develops systems products and processes to satisfy the needs of the customer. In the DoD, Systems Engineering activities are based around eight technical management processes (technical planning, requirements management, interface management, risk management, onfiguration management, technical data management, technical assessment, and decision analysis).

> Important Design Considerations. A number of key areas, some of which are mandated by statute, are called out for special consideration and emphasis during the design solution process. They form the basis for trade-offs in seeking an timal, life cycle balanced technical solution. These design considerations are described in Chapter 4 of the Defense Acquisition Guidebook (DAG). Configuration Management (CM) Baselines:

• Functional Baseline. The technical portion of the program requirements (system performance specification) that provides the basis for contracting and controlling the system design. It is normally established by the government at the stem functional review (SFR). Allocated Baseline defines the performance requirements for each configuration

item of the system (item performance specifications). The contractor normally establishes this early in the process (not later than the preliminary design review [PDR]). Government control is typically deferred until the system erification review (SVR). • Product Baseline is established by the detailed design documentation for each Configuration Item (CI). It includes the process and materials baseline (process and materials specifications). Government control depends on program

tion audit (PCA). Technical Management Plans Systems Engineering Plan (SEP) (required at each milestone) is a comprehensive, living document that defines the program's systems engineering activities, ldressing both government and contractor technical activities and responsi-

quirements but, if established, is typically done at the physical configura-

major tasks and activities and lays out the necessary conditions to complete Integrated Master Schedule (IMS) is a time-based planning tool that uses a calendar or detailed schedule to demonstrate how work efforts will support tasks and events, often integrated with an IMP. **Reviews and Audits.** (These are tailored to the program's acquisition strategy.)

Integrated Master Plan (IMP) is an event-driven plan that defines a program's

• Assessment of Operational Test Readiness (AOTR). An independent assessment by the office of the USD(AT&L) of operational test readiness for all ACAT ID programs and special interest programs.

• Initial Technical Review (ITR). A multi-disciplined technical review to support a

program's initial POM submission.

• Alternative Systems Review (ASR). A technical review that demonstrates the preferred concept is cost effective, affordable, operationally effective and suitable, and can be developed to provide a timely solution to a need at an acceptable level of risk System Functional Review (SFR). A formal review of the conceptual design of the

system to establish its capability to satisfy requirements. It establishes the functional baseline • System Requirements Review (SRR). A formal, system-level review conducted to ensure that system requirements have been completely and properly identified and that a mutual understanding between the government and contrac-

• Software Specification Review (SSR). A subsystem formal review of requirements and interface specifications for computer software configuration items. • Preliminary Design Review (PDR). A formal review that confirms the preliminary design logically follows the SFR findings and meets the requirements. It nor-

mally results in approval to begin detailed design

for the production phase.

T&E oversight list.

• Critical Design Review (CDR). A formal review conducted to evaluate the complete ness of the design and its interfaces • Test Readiness Review (TRR). A formal review of contractors' readiness to begin testing on both hardware and software configuration items.

• Functional Configuration Audit (FCA). A formal review conducted to verify that all subsystems can perform all of their required design functions in accordance with their functional and allocated configuration baselines. • System Verification Review (SVR). A formal review conducted to verify that the actual item (which represents the production configuration) complies with the

performance specification. • Physical Configuration Audit (PCA). A formal audit that establishes the product base line as reflected in an early production configuration item. • Production Readiness Review (PRR). A formal examination of a program to determine if the design is ready for production, production engineering problems

have been resolved, and the producer has accomplished adequate planning

• In-Service Review (ISR). A formal technical review that is to characterize in-Service technical and operational health of the deployed system by providing an assessment of risk, readiness, technical status, and trends in a measurable form that will substantiate in-Service support and budget priorities. Test and Evaluation (T&E) is a verification and validation process by which a system or components are compared against capability needs and specifications

through testing. The results are evaluated to assess progress of design, performance, supportability, etc Beyond Low-Rate Initial Production (BLRIP) Report. Completed by the Director, Operational Test and Evaluation (DOT&E) to assess the IOT&E for MDAPs prior to the FRP decision review (or, before proceeding beyond LRIP hence the name of the report). A copy is provided to the USD(AT&L) and to

the congressional defense committ • Combined Developmental and Operational Testing (DT/OT). Combining DT and OT is encouraged to achieve time and cost savings. The combined approach must not compromise either DT or OT objectives. A final independent phase of IOT&E is required for ACAT I and II and other programs on the OSD T&E oversight list prior to the FRP decision.

• **Developmental Test and Evaluation (DT&E).** A technical test conducted to provide

data on the achievability of critical system performance parameters. This verification testing is performed on components, subsystems, and systemlevel configurations of hardware and software. • Evaluation Strategy. A description of how the capabilities in the ICD will be evaluated once the system is developed. The evaluation strategy will evolve economically.

into the TEMP, which is first due at Milestone B. • Follow-On Operational Test & Evaluation (FOT&E). OT&E needed during and after the production phase to refine estimates from the IOT&E, to evaluate system changes, and to re-evaluate the system as it continues to mature in the field. FOT&E may evaluate system performance against new threats or in new environments. • IOT&E. All OT&E that is conducted on production or production representa-

tive articles to support a full-rate production decision. It is conducted to

provide a valid estimate of expected system operational effectiveness and

suitability for ACAT I and II programs and other programs on the OSD

lethality aspects of conventional missiles, munitions, or weapon systems. LFT&E is required by law (Title 10 U.S.C. 2366) for covered systems, major munitions programs, missile programs, or product improvements to covered systems major munitions programs, or missile programs, before they can proceed beyond LRIP. A covered system is a system that DOT&E has determined to be ACAT I or ACAT II program, user occupied and designed to provide protection to occupants; or a conventional munitions or missile program; or, a mod to a covered system that is likely to significantly affect the survivability or lethality of the system

• LFT&E Report. Completed by DOT&E for covered systems that have been subjected to a full-up live fire test prior to FRP decision review. Usually included in DOT&E report of IOT&E (BLRIP report) when sent to Congress.

• Modification T&E. Testing done after FRP decision review to evaluate modifications/upgrades/improvements to an in-production or fielded system. • Operational Assessment (OA). An evaluation of operational effectiveness and suitability made by an independent operational test agency, with user support as required, on other-than-production systems. An OA conducted during integrated system integration is often called an early operational assessment (EOA).

• Operational Test and Evaluation (OT&E). The field test, under realistic conditions, of any item (or key component) of weapons, equipment, or munitions for the purpose of determining and validating the effectiveness and suitability of the weapons, equipment, or munitions for use in combat by typical military \bullet Production Acceptance T&E (PAT&E). T&E of production items to demonstrate that

items procured fulfill the requirements and specifications of the procuring contract or agreements • Production Qualification T&E (PQT&E). A technical test conducted to ensure the effectiveness of the manufacturing process, equipment, and procedures. These tests are conducted on a number of samples taken at random from the first production lot and are repeated if the design or process is changed

• Qualification Testing. Testing that verifies the contractor's design and manufacturing process and provides a performance parameter baseline for subsequent tests. (Best Practice) • Test and Evaluation Master Plan (TEMP). Documents the overall structure and objectives of the T&E program. It provides a framework within which to generate detailed T&E plans and documents schedule and resource implications associated with the T&E program. The TEMP identifies the necessary

DT&E, OT&E, and LFT&E activities. It should be closely aligned with the

definite degradation as a result of having been subjected to a certain level of

• Test and Evaluation Strategy (TES). An early test and evaluation planning document that describes the overall approach for integrating developmental, operational, and live-fire test and evaluation and addresses test resource planning. Over time, the scope of this document will expand and evolve into the TEMP. • **Vulnerability T&E.** Testing a system or component to determine if it suffers

effects in an unnatural, hostile environment. A subset of survivability. Manufacturing (also called Production) is the conversion of raw materials into products and/or components through a series of manufacturing procedures and processes. Manufacturing management is the technique of planning, organizing, directing, controlling, and integrating the use of people, money, materials, equipment, and facilities to accomplish the manufacturing task An acquisition strategy outlines the approach to obtaining a certain amount

of a product or system, within a planned timeframe and funding. The desired product or system has to be manufactured/produced to a quality level that provides confidence the system will perform as advertised. The production strategy is the approach to obtaining the total quantity of the system, at some rate, for some cost, and must match up with the acquisition strategy.

The role of manufacturing during the pre-production period is to influence the design of the subsystems and systems and to prepare for production. Once production has been authorized, the role of manufacturing is to execute the manufacturing plan. The overall objective of manufacturing is to provide a uniform, defect-free product with consistent performance and a lower cost in terms of both time and money.

• Design Producibility. A measure of the relative ease of manufacturing a product variation during fabrication, assembly, integration and testing of components, processes, and procedures

View

elates systems, service

facilities, tooling, and personnel resources to produce the design. The manu
• The Product Support Integrator (PSI) is an organic or private sector organization the processes are repeatable, and process improvements are constantly • Îndustrial Capability Assessment (ICA). A legal requirement (10 U.S.C. 2440) at each

support, and (if appropriate) restart the program

milestone to analyze the industrial capability to design, develop, produce,

• The Manufacturing Plan is a formal description of a method for employing the

• The "5Ms" are Manpower, Materials, Machinery, Methods, and Measurement. These are five major elements of all manufacturing and production efforts, and are referred to during resource requirements risk identification and management. • Variation Control. Identification of key process and product characteristics, and reduction/elimination of significant differences from the nominal values of those characteristics so that those differences would not cause unacceptable degradation in product cost, quality, delivery schedule, or performance. • **Process Proofing.** Demonstration of the required manufacturing capability in a

realistic, production-representative facility. • Lean. A fundamental way of thinking, intended to enable flexibility and waste reduction in order to reduce costs, cycle time, and defective products by focusing on those actions that will provide value to the end-item customer. Engineering and Manufacturing Readiness Levels. A means of communicating the degree to which a technology is producible, reliable, and affordable. Their use is consistent with efforts to include the consideration of engineering, manufacturing, and sustaninment issues early in a program.

10. LIFE CYCLE LOGISTICS (LCL) is the planning, development, implementation, and management of a compe able, and effective systems support strategy within TLCSM. Life cycle logistics encompasses the entire system's life cycle including acquisition (design, develop, test, produce, and deploy), sustainment (operations and support), and disposal. The principal goals/objectives of acquisition logisticians are to: 1. Influence product design for affordable system operational effectiveness

3. Acquire and concurrently deploy the supportable system, including support

4. Maintain/improve readiness, improve affordability, and minimize logistics Acquisition Logistics. DoD decision makers must integrate acquisition and logistics to ensure a superior product support process by focusing on affordable system operational effectiveness as a key design and performance factor, and emphasizing life cycle logistics considerations in the systems engineering

Performance-Based Life-Cycle Product Support (PBL) is the purchase of support as an integrated, affordable, performance package designed to optimize system readiness and meet performance goals for a weapon system through longterm support arrangements with clear lines of authority and responsibility. PBL is DoD's preferred approach for product support implementation.

 The Product Support Strategy (PSS) is part of the acquisition strategy, and addresses design. Emphasis is on simplicity of design and reduction in opportunities for life cycle sustainment and continuous improvement of product affordability, reliability, and supportability, all while sustaining readiness. It ensures that system support and life cycle affordability considerations are addressed and

facturing plan must ensure that the items produced reflect the design intent, that is selected to serve as the single point of accountability for integrating all sources of support necessary to meet the agreed-to support/performance • Performance-Based Agreements (PBAs) establish a negotiated baseline of performance, and corresponding support necessary to achieve that performance,

> whether provided by commercial or organic support providers. PBAs with users specify the level of operational support and performance required by • Supportability Analyses are a set of analytical tools used as an integral part of the systems engineering process. These tools help determine how to most cost effectively support the system throughout the life cycle and form the basis for

design requirements stated in the system performance specification and the product support management plan • Reliability, Maintainability, and Supportability (RMS) are key components of system

operational effectiveness. • The Product Support Package identifies support requirements based upon the inherent reliability and maintainability of the system. This total system product support package identifies the support elements that make up the PBL package. Continuous assessment of in-Service system performance will identify needs for system improvements to enhance reliability, slow obsolescence, and reduce/minimize corrosion or other LCL characteristics. This package details

requirements for the following elements: • Supply Support (spare/repair parts) Maintenance Planning • Test/Support Equipment Technical Documentation/IETM

 Manpower & Training/CBT • Facilities/PHS&T Design Interface/Computing Support • Pre-Deployment Evaluations of the system must demonstrate supportability and life cycle affordability as entrance criteria for the production and deployment

2. Design and develop the support system utilizing performance-based logistics • Post Deployment Evaluations of the system beginning with the Pre-IOC SR verify whether the fielded system meets thresholds and objectives for cost, performance, and support parameters, and support continuous improvement. • Key Acquisition Documents that reflect support inputs include the ICD, analysis of alternatives (AoA), CDD, CPD, TEMP, acquisition program baseline (APB), and the contract

> The material on this chart may not reflect the Defense Acquisition Guidebook (DAG) under revision when printed. Therefore, if there are any conflicts between this

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Recommendations to improve this chart are encouraged and may be sent to wallchart@dau.mil.

of the DAU Acquisition System Chart. This chart is not a substitute for any offical DoD publication.

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E-mail: daupubs@dau.mil

Physical address: Room 7, Bldg 231, at the Defense

chart and the DAG, the DAG takes precedence.

Mailing address:

Acquisition University Fort Belvoir